

## **FLUID NOZZLE AND ADAPTER FOR EXISTING FLUID NOZZLES**

The invention relates to fluid delivery systems and particularly to nozzles such as those used for gasoline delivery to vehicles. While the invention has particular application to nozzles used to deliver liquids such as gasoline as well as other fluid fuels to cars, trucks, buses, boats, race cars and the like, it will be understood that the invention also has application to nozzles for delivery of other fluids in a wide variety of applications. For example, the apparatus in accordance with the present invention may be utilized in the delivery of other petroleum products such as the nozzles used in delivering home heating oil, Marine, aircraft and diesel fuels as well as other liquid or fluid dispensing units including but not limited to firefighting hoses.

Nozzles utilized for dispensing gasoline to motor vehicles, at least in the United States, are designed to capture smog-forming vapors at service stations. They often incorporate accordion-like seals that some motorists contend make the nozzles more difficult to use. Vapor recovery nozzles on gas pumps are the most visible part of a system designed to capture hydrocarbons that otherwise would be vented to the air where they form urban smog. Similar vapor collection devices are used to unload tanker ships, on refineries, bulk loading terminals and on gasoline tanker delivery trucks, producing an airtight gasoline distribution network. In addition to reducing hydrocarbon that forms urban smog, vapor recovery nozzles reduce personal exposure to benzene, a highly toxic component of gasoline vapor.

Conventional gasoline dispensing nozzles are often found to be difficult to operate by handicapped, physically impaired, prosthetic limb users, and other disadvantaged consumers.

The prior art includes ball valve structures having a horseshoe shaped control arm to rotate the ball thereof to change the rate of fluid flow. In such structures the horseshoe shaped handle is fixed to an axis that is fixed to a ball having an

1 opening extending through it. Movement of the horseshoe shaped handle  
2 causes the opening in the ball to align or not align with opposed coaxial inlet and  
3 outlet ports. Conventional fuel delivery nozzles do not utilize ball valves and thus  
4 the teachings of the prior art apparatus are not readily applicable to the valves  
5 used for gasoline nozzles and the like.

6  
7 The conventional prior art gasoline dispensing nozzles include a pivotally  
8 mounted lever and a handle. Operation of the nozzle requires the user to apply a  
9 squeezing force with his or her fingers, to cause the pivotally mounted lever to  
10 move towards the handle. This motion and specifically the required motor skills  
11 and muscular strength in the fingers is difficult to achieve for some  
12 disadvantaged persons.

## 13 14 15 **SUMMARY THE INVENTION**

16  
17 It is an object of the invention to provide apparatus that can be operated by  
18 persons who may not have the physical ability to easily manipulate the existing  
19 apparatus and will be able to operate the apparatus in accordance with the  
20 present invention with even relatively little strength in the fingers.

21  
22 It is another object the invention to provide apparatus that enables the user to  
23 provide a single force which will simultaneously control the rate of flow of a fluid  
24 in which will simultaneously urge the nozzle toward the refueling connection of  
25 the vehicle been fueled.

26  
27 Still another object the invention is to provide apparatus comprising both an  
28 entire nozzle assembly as well as apparatus for retrofitting existing nozzle  
29 assemblies.

1 Yet another object of the invention is to provide apparatus that can be operated  
2 primarily with the muscles of the arm and movement of the torso of the user  
3 rather than merely the fingers.

4

5 It is now been found that these and other objects of the invention may be  
6 attained in a fluid dispensing nozzle which includes an elongated body having a  
7 fluid inlet and a fluid outlet, a valve having an open position and a closed position,  
8 the valve having first and second ports, the first and second ports being in fluid  
9 communication within the valve in the open position and not in fluid  
10 communication in the closed position. The first port is in fluid communication  
11 with the inlet and the second port is in fluid communication with the outlet. The  
12 apparatus includes structure for operating the nozzle that includes a pivotally  
13 mounted lever having a handle portion which is movable toward and away from  
14 said outlet, movement of said handle portion toward said outlet increasing the  
15 rate of fluid flow by increasing the opening of said valve, whereby a handicapped  
16 user may use arm or torso movement to both urge the nozzle toward a vehicle  
17 being refueled as well has changed the rate of fluid flow.

18

19 In other forms of the invention the fluid dispensing nozzle includes an elongated  
20 body having a fluid inlet and a fluid outlet, a valve having an open position and a  
21 closed position, the valve has first and second ports, the first and second ports  
22 are in fluid communication within the valve in the open position and not in fluid  
23 communication in the closed position, the first port is in fluid communication with  
24 the inlet and the second port is in fluid communication with the outlet, the nozzle  
25 further includes a pivot mounting carried on the body, a first lever pivotally  
26 mounted on the pivot mounting, the first lever is coupled to the valve whereby  
27 pivotal movement of the first lever causes the valve to move between the open  
28 and the closed positions. The apparatus also includes a second lever pivotally  
29 mounted on the body, the second lever engages the first lever whereby pivotal  
30 movement of the second lever results in pivotal movement of the first lever about  
31 a first axis to move the valve to the open position.

1 in some forms of the invention the second lever is generally L-shaped. The  
2 second lever may comprise first and second arms intersecting with an included  
3 angle of approximately 90° and said second lever is mounted for pivotal  
4 movement proximate to the intersection of said first and second arms. Similarly,  
5 the second lever is pivotally movable toward and away from said fluid outlet and  
6 in some cases pivotal movement of the second lever toward the fluid outlet  
7 causes an engagement of the second lever with the first lever which causes  
8 opening of the valve.

9  
10 In some cases the second lever is mounted for pivotal movement about a second  
11 axis and the second axis is parallel to the first axis. The elongated body may  
12 have an external surface that is generally a cylindrical section and the second  
13 lever may have a generally cylindrical section shaped first arm that nest together.  
14 The second lever may have a roller mounted thereon that is dimensioned and  
15 configured for engagement we said first lever.

16  
17 Other forms of the invention provide an attachment for a fluid dispensing nozzle  
18 having an elongated body having a fluid inlet and a fluid outlet, a valve having an  
19 open position and a closed position, the valve having first and second ports, the  
20 first and second ports being in fluid communication within the valve in the open  
21 position and not in fluid communication in the closed position, the first port being  
22 in fluid communication with the inlet and the second port being in fluid  
23 communication with the outlet wherein the improvement includes structure for  
24 mounting an attachment on the elongated body and structure for operating the  
25 the nozzle including a pivotally mounted lever having a handle portion which is  
26 movable toward and away from the outlet, movement of the handle portion  
27 toward the outlet increases the rate of fluid flow by increasing the opening of the  
28 valve, whereby a user may use arm or torso movement to both urge the nozzle  
29 toward a vehicle being refueled as well has changed the rate of fluid flow.

1 In some forms of the invention the attachment is adapted for corporation with an  
2 associated fluid dispensing nozzle having an elongated body having a fluid inlet  
3 and a fluid outlet and a valve having an open position and a closed position and  
4 first and second ports. The associated fluid dispensing nozzle has first and  
5 second ports that are in fluid communication within the valve in an open position  
6 and not in fluid communication in an closed position, the first port is in fluid  
7 communication with the inlet and second port is in fluid communication with the  
8 outlet, the nozzle further including a pivot mounting carried on the body, and a  
9 first lever pivotally mounted on the pivot mounting, the first lever is coupled to the  
10 valve whereby pivotal movement of the first lever causes the valve to move  
11 between said open and said closed positions. The attachment includes  
12 apparatus for mounting on the elongated body and a second lever pivotally  
13 mounted on said apparatus for mounting, the second lever is dimensioned and  
14 configured for engaging said first lever whereby pivotal movement of the second  
15 lever results in pivotal movement of the first lever about a first axis to move the  
16 valve to and open position.

17  
18 In some forms of the invention the second lever is generally L-shaped and may  
19 comprises first and second arms intersecting with an included angle of  
20 approximately 90°. The second lever may be mounted for pivotal movement  
21 proximate to the intersection of said first and second arms. The second lever  
22 may being pivotally movable toward and away from the fluid outlet. In some  
23 cases pivotal movement of the second lever toward the fluid outlet causes an  
24 engagement of the second lever with the first lever which causes opening of said  
25 valve. The second lever may be mounted for pivotal movement about a second  
26 axis and the second axis may being parallel to the first axis. The elongated body  
27 may have an external surface that is generally a cylindrical section and the  
28 second lever may have a generally cylindrical section shaped first arm so that the  
29 to cylindrical section shaped services will nest together.

1 19. The attachment for cooperation with a fluid delivery nozzle as described in  
2 claim in each wherein said surface on said elongated body that is generally a  
3 cylindrical section nests with said generally cylindrical section shaped surface  
4 first arm.

5  
6 20. The attachment for cooperation with a fluid delivery nozzle as described in  
7 claim 11 wherein:

8 said second lever has a roller mounted thereon that is dimensioned and  
9 configured for engagement we said first lever.

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21 **BRIEF DESCRIPTION OF THE DRAWINGS**

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23 The invention will be better understood by reference the accompanying drawings  
24 in which:

25  
26 Figure 1 is a side elevation view of one form of the nozzle in which operation is  
27 achieve by application of a force in a direction which tends to urged the nozzle  
28 toward the tank to which a liquid, such as gasoline, is being added.

29  
30 Figure 2 as a top plan view of the nozzle illustrated in Figure 1.

1 Figure 3 is a side elevation view of the apparatus illustrated in Figure 1.

2

3 Figure 4 is as a perspective view of the apparatus illustrated in Figure 1.

4

5 Figure 5 is another perspective view of the apparatus illustrated in Figure 1.

6

7 Figure 6 is still another perspective view of the apparatus illustrated in Figure 1.

8

9 Figure 7 is a side elevation view of a portion of the apparatus illustrated in Figure  
10 1 which is also suitable for retrofit of the existing nozzles.

11

12 Figure 8 is a side elevation view of the apparatus illustrated in Figure 7.

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14 Figure 9 is a top plan view of the apparatus illustrated in Figure 7.

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16 Figure 10 is a perspective view of the apparatus illustrated in Figure 7.

17

18 Figure 11 is a side elevation view of a second embodiment of the invention in  
19 which the user applies a force that is generally in the direction of the user.

20

21 Figure 12 as a perspective view of a third embodiment of the invention in which  
22 the operating handle and is disposed below the rest of the mechanism.

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## 25 **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

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27 Referring now to Figures 1-10 there is shown a preferred embodiment of the  
28 apparatus in accordance with the present invention. This embodiment includes  
29 both a conventional nozzle 10 and an adapter 12. The conventional nozzle 10  
30 includes an elongated housing having an outlet 14, an inlet 16, and guard 18.  
31 Carried on the elongated housing is a pivotally mounted first lever 20. In the

1 conventional manner, pivotal movement of the first lever 20 in the upward  
2 direction (as shown in Figure 1) causes a valve 22 to open to allow fluid flow from  
3 the inlet 16 to the outlet 14. Commonly, such nozzles 10 currently include an  
4 accordion-like seal 24 that is part of a vapor recovery system designed for  
5 environmental protection purposes.

6  
7 The adapter or attachment 12 as best seen in Figures 8-10 includes a base 26  
8 this secured by two mounting clamps 28 to the elongated housing intermediate  
9 the outlet 14 and inlet 16 as best seen in Figure 1. An L-shaped lever 34, also  
10 referred to as a second lever herein, is joined to the base 26 by a hinge or pivot  
11 30. The hinge or pivot 30 has an axis that may be referred to herein as the  
12 second axis. The L-shaped lever 34 comprises a first arm 36 which overall is  
13 generally a cylindrical section. The first arm 36 includes a collar 38 that is also  
14 formed in the shape of a cylindrical section and more particularly to nest with a  
15 cylindrical section shaped surface 40 that is a part of the elongated housing  
16 adjacent to the inlet 16. the L-shaped lever 34 also comprises a second arm 42.  
17 In the preferred embodiment the second arm is formed as to identical parallel  
18 elements between which is supported a bolt 44 secured by a nut 46. A roller 48  
19 preferably moves freely about the bolt 44. It is this world or 48 that engages the  
20 conventional first lever 20 as best seen in Figure 4. The roller is preferred to  
21 avoid friction however a sliding interface may be utilized in other embodiments.

22  
23 Referring now to Figure 11 there is shown a second embodiment having a lever  
24 60 that is pivotally mounted in a pivot 62 carried by the guard 18 a roller 64  
25 engages the conventional first lever 20. In this embodiment the user applies a  
26 force toward his or her body to to the front surface 66 of the lever 60. For some  
27 handicapped persons this alternative may be easier to operate.

28  
29 Referring now to Figure 12 their shown still another embodiment invention which  
30 also uses an L-shaped lever 70 that has a pivot 72 at the lower surface of the  
31 guard 18. A roller 74 is provided for engagement with the conventional lever 20.

1  
2 It will be seen that the user of the apparatus in accordance with present invention  
3 is enables to operate the nozzle without the need for the same level of physical  
4 strength in his or her fingers. More specifically in the embodiment illustrated in  
5 Figures 1-10 the user can apply a force with the palm of his or her hand using the  
6 muscles of the arm and/or merely shifting the torso to use his or her body weight  
7 to not only urge the nozzle 10 into engagement with the vehicle as well as to  
8 regulate the rate of fluid flow.

9  
10 The embodiments of Figures 11 and 12 illustrate other possible forms of the  
11 invention. For some persons with various afflictions such other forms may be  
12 more advantageous. Although the present invention has been described in  
13 terms of an L-shaped lever it will be understood that other forms of the invention  
14 may have a lever having another shape.

15  
16 Similarly, although the invention has been described in terms of a second lever  
17 that cooperates with the conventional first lever, it will be understood by those  
18 skilled in the art that in other forms of the invention the first lever may be  
19 eliminated and the lever that is referred to herein as the second lever may be the  
20 only lever required. Such embodiments are contemplated by the present  
21 invention and would still retain the advantage of being easy to operate by a  
22 handicapped user as well as being easier operate even by users who are not  
23 handicapped.

24  
25 The invention has been described with reference to the preferred embodiments.  
26 Persons skilled in the art of such inventions name upon exposure to the  
27 teachings herein, conceive other variations, such variations are deemed to be  
28 encompassed by the disclosure, the invention being delimited only by the  
29 following claims.